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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,105	02/08/2002	Shyam Kutty	IO-1065	1443
24923	7590	08/16/2004	EXAMINER	
PAUL S MADAN MADAN, MOSSMAN & SRIRAM, PC 2603 AUGUSTA, SUITE 700 HOUSTON, TX 77057-1130			HUGHES, SCOTT A	
			ART UNIT	PAPER NUMBER
			3663	

DATE MAILED: 08/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/071,105	KUTTY ET AL.	
	Examiner	Art Unit	
	Scott A Hughes	3663	NW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-54 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/12/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities:

In the Description of the Figures, the word "illustrates" is missing from the description of Figures 1B and 1C.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 4, 5, 9, 10 and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Bouyoucos (Jan. 22, 2004).

With regard to claims 1 and 24, Bouyoucos discloses an array 14 with a first cluster containing at least two acoustic sources 30. He discloses attaching all of the sources to a common array, and therefore the acoustic sources are disposed at a substantially common depth (paragraph [0004]). He discloses that the longitudinal axes of the sources are substantially orthogonal to a pre-determined direction of towing

(paragraph [0032], Figs. 2a, 2b). Bouyoucos discloses at least one protective tube 33 (Fig. 2) enclosing a portion of a supply line between the termination and the acoustic sources. The protective tube would enclose supply lines going to any type of device such as a positioning device, gun controller, or depth measurement device located on the array.

With regard to claim 3, Bouyoucos discloses the protective tube 33 comprising a coupling 31 (Fig. 2) having a neck portion matable with the acoustic source and a portion adapted to enclose a portion of the supply line 33 (paragraph [0037]). He discloses the coupling as a flexible sleeve 31 (paragraph [0034]).

With regard to claim 4, Bouyoucos discloses at least two air guns 30 (Fig. 2a) in the first cluster.

With regard to claim 5, Bouyoucos discloses air guns having a connection interface for receiving gas, electrical power, and data (paragraphs [0037] and [0039]). He discloses first and second sets of guns with interfaces oriented in different directions in Fig. 7.

With regards to claims 9 and 10, Bouyoucos discloses air guns including ports 307 (Fig. 2c) in a first cluster. He discloses that the ports are aligned along a first plane, said plane being made by the ladder on which the guns are mounted (paragraph [0004]). He further discloses additional ports 307 aligned in a plane parallel to the first plane (Fig. 2a-c).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 6, 13, 14, 15, 16, 18, 19, 24, 25, 28, 29, 34, 35, 37, 39, 44, 45, 46, 47, 50, and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bouyoucos in view of Sanchez.

With regards to claims 2, 15, 19, 25, 29, and 37, Bouyoucos discloses the longitudinal axes of at least two air gun acoustic sources 30 as being parallel to the water surface (paragraph [0032], Figs. 2a, 2b) and perpendicular to the direction of towing (Fig. 19). He does not disclose the axes of the acoustic sources as being perpendicular to the water surface. Sanchez discloses the longitudinal axes of acoustic sources as being perpendicular to the water surface (Fig. 2). It would have been obvious to modify Bouyoucos to include an array of acoustic sources whose axes were perpendicular to the water surface as taught by Sanchez in order to create an acoustic signal dependent upon such an orientation.

With regards to claims 6, 18, 28, 39, and 47 Bouyoucos discloses air guns 30 with connection interfaces for gas, electrical power, and data (paragraphs [0037] and [0039]). He does not disclose have the interfaces oriented in the same direction. Sanchez teaches orienting the interfaces 7 (Fig. 2) in the same direction (Column 3, Lines 115-35). It would have been obvious to modify Bouyoucos in order to align the

interfaces in the same direction in order to fit a different harness configuration or to have a specific configuration of airguns.

With regard to claim 13, Sanchez discloses a harness 5 including chains 8 and 8' that absorbs a substantial portion of the tension force during towing (Column 1, Lines 5-15). It would have been obvious to modify Bouyoucos to include a harness as taught by Sanchez in order to take the tension force off of the supply lines as the acoustic source array is being towed.

With regard to claim 14, Bouyoucos does not disclose a harness with a collar associated with each source, nor does he disclose linking members providing a connection between each collar. Sanchez discloses linking members 8 between the sources. It would have been obvious to include the linking members taught by Sanchez with collars on the sources of Bouyoucos in order to provide a mechanical connection between each source.

With regards to claim 16 and 46, Bouyoucos discloses at least two air guns 30 in a cluster (Fig. 2).

With regard to claim 24, Bouyoucos discloses towing a plurality of acoustic sources 30 (Fig. 2a) each having a longitudinal axis. He discloses an array having a first cluster formed by aligning the longitudinal axis of each source substantially orthogonal to the direction of towing (Figs. 2a,b). He further discloses enclosing a tubular member 31 over a portion of supply line 33 between a termination and the sources. He does not disclose positioning the sources in a plane generally parallel with the water surface. Sanchez teaches positioning acoustic sources 1 (Fig. 1) along a

plane parallel to the water surface (Column 1, Lines 10-25). It would have been obvious to modify Bouyoucos to arrange the acoustic sources in a plane parallel to the water surface as taught by Sanchez in order to produce a different acoustic wave from the sources.

With regard to claim 34, Sanchez teaches connecting the sources 1 (Fig. 2) to a termination A (Fig. 2) that absorbs a substantial portion of the tension force induced during towing (Column 3, Lines 5-15). It would have been obvious to modify Bouyoucos to include connecting the sources to a termination in order to absorb part of the tension force induced by towing.

With regard to claim 35, Sanchez teaches a collar 8 (Fig. 3) linking all each source to the termination. It would have been obvious to modify Bouyoucos to include a collar linking each source to the termination in order to reduce the tension force from towing as taught by Sanchez.

With regards to claims 44, 45, 50, and 54, Bouyoucos discloses an acoustic array 14 including at least one cluster of two acoustic sources 30, said sources having a longitudinal axis. He discloses the longitudinal axis of each source as being substantially orthogonal to the direction of towing (Fig. 19). Bouyoucos discloses a supply line 33 connected to the acoustic array adapted to convey power and data to the array. He discloses a protective tubing 31 enclosing a part of the supply line. Bouyoucos discloses a harness (paragraph [0004]) that connects to each of the acoustic sources. He also discloses a boat 10 to which the towline is attached. Sanchez discloses sources 1 aligned at a common depth in a plane parallel to the

surface of the water whose longitudinal axes are orthogonal to the direction of towing. He further discloses a harness 5 that connects to each of the acoustic sources and a termination A matable with the supply and the harness. He also discloses a towline connected to the termination for towing the array through water. It would have been obvious to modify Bouyoucos to include aligning the array parallel to the water as taught by Sanchez in order to have a different type of acoustic signal. It would have been obvious to modify Bouyoucos to include a termination matable with the supply and harness, said termination being connected to a tow line, in order to tow the array through the water while the harness absorbs part of the tension force.

Claims 7, 8, 17, 26, 27, 36, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bouyoucos in view of Williams.

With regard to claim 7, 17, 26, 27, 36, and 38, Bouyoucos discloses air guns having a connection interface for receiving gas, electric power, and data. He discloses orienting the interface for a first set of guns in one direction and orienting the faces of a second set of guns in a second direction (Fig. 4a, paragraph [0004]). He does not disclose a connector that mates to the supply line without causing substantial bending of the supply line. Williams teaches a coupling 70 and coupling body 80 (Fig. 3) for connecting cables (Column 4, Lines 17-23). It would have been obvious to modify the connection interface of Bouyoucos to include the connector taught by Williams in order to couple the connection interface to the supply line without causing damage to the supply line.

With regard to claim 8, Williams discloses a coupling with a first shell 72 and second shell 90. It would have been obvious to modify the tube of Bouyoucos to include the first and second shell as taught by Williams in order to couple the tube to the source.

Claims 11, 12, 22, 23, 30, 31, 40, 41, 48, 49, 51, 52, are rejected under 35 U.S.C. 103(a) as being unpatentable over Bouyoucos in view of Nootboom. Nootboom teaches equations for calculating the center-to-center spacing of airguns in his "Signature and Amplitude of Linear Airgun Arrays." It would have been obvious to include using a pre-defined equation as taught by Nootboom in order to calculate the center-to-center spacing of airguns to be within a certain range in order to produce the desired results.

With regard to claims 20, 21, 32, 33, 42, 43, 53 Bouyoucos discloses air guns including ports 307 (Figs. 2a-c) in a first cluster. He discloses that the ports are aligned along a first plane, said plane being made by the ladder on which the guns are mounted (paragraph [0004]). He further discloses additional ports 307 aligned in a plane parallel to the first plane (Figs. 2a-c).

Claims 1, 3, 16, 24, 34, 44, 45, 46, 50 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez in view of Allensworth.

With regards to claims 1, 16 and 24, Sanchez discloses an array of more than two acoustic sources 1, each source having a longitudinal axis. He discloses the sources 1 as being disposed at a common depth with the longitudinal axes being

orthogonal to the direction of towing (Fig. 2). He does not disclose a protective tube for enclosing a portion of a supply line between the termination A and acoustic sources 1. Allensworth discloses a protective tube 22 shown in detail in Fig. 2 (Column 2, Lines 25-48). It would have been obvious to include the protective tubing taught by Allensworth in the acoustic source array of Sanchez in order to protect the cables, supply lines, and other aspects of the array.

With regard to claim 3, Allensworth discloses a coupling 26 (Fig. 3) matable with the acoustic source and supply line. It would have been obvious to modify Sanchez to include the coupling taught by Allensworth in order to connect the acoustic sources to the supply line.

With regard to claim 4, Sanchez discloses at least two air guns 1 in a first cluster.

With regards to claims 34, 44, 45, 46, 50, and 54, Sanchez discloses an acoustic array containing a cluster of acoustic sources 1 (which are air guns). He discloses the sources as each having a longitudinal axis, and also as being aligned in a plane parallel with the surface of the water (Fig. 2). He shows the longitudinal axis of the sources as orthogonal both the direction of towing and to the surface of the water (Fig. 2). Sanchez discloses a harness 5 connected to each of the acoustical sources (by means of chains 8). Sanchez also discloses a termination A matable with a supply line, harness, and towline. Sanchez discloses a harness 5 including chains 8 and 8' that absorb a substantial portion of the tension force during towing (Column 1, Lines 5-15). Sanchez does not disclose a supply line, including a protective tube covering, connected to the acoustic array to convey electric power, data, and gas to the sources. He also does not

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disclose a vessel to which the towline is attached. Allensworth discloses a tow vessel

12. Allensworth further discloses a protective tube 46 (Fig. 2) covering a portion of a supply line 22 that conveys electrical power, data, and gas to the acoustic array. It would have been obvious to modify Sanchez to include the tow vessel and supply line with protective tube taught by Allensworth in order to tow the apparatus through the water and to protect the supply lines while in the water.

Claims 2, 5, 6, 7, 15, 17, 18, 19, 25, 26, 27, 28, 29, 36, 37, 38, 39, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez in view of Bouyoucos (Nov. 24, 1998).

With regards to claims 2, 15, 19, 25, 29, and 37, Sanchez discloses the longitudinal axis of each source being perpendicular to the water surface (Fig. 2). He does not disclose each axis being parallel to the water surface. Bouyoucos discloses a longitudinal axis 20a (Fig. A) that is parallel to the surface of the water. It would have been obvious to modify Sanchez to include an array where the longitudinal axis of each source was parallel to the surface of the water in order to obtain a different acoustic signal.

With regards to claims 5, 6, 7, 17, 18, 26, 27, 28, 36, 38, 39, and 47, Sanchez discloses a connection interface 7 connected to the supply lines for each gun adapted for receiving gas, electrical power, and data (Column 3, Lines 15-35). He also discloses aligning the guns in the same direction. Therefore, the connection interfaces 7 of each air gun 1 are all aligned in the same direction (Fig. 2). Sanchez does not disclose connection interfaces aligned in different directions. Bouyoucos discloses an interface

50 (Fig. 8) which are aligned with the spreader bars 30. It would be obvious to modify the interfaces of Sanchez to include interfaces with different orientations depending upon the structure of the array, such as the structure taught by Bouyoucos.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez in view of Williams. Williams discloses a coupling with a first shell 72 and second shell 90. It would have been obvious to modify the supply line of Sanchez to include the first and second shell as taught by Williams in order to couple the supply line to the source.

Claims 9, 10, 20, 21, 32, 33, 42, 43 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez in view of Bouyoucos (Feb. 6, 2001). Bouyoucos discloses ports 12 aligned in a plane and a second set of ports 16 aligned in a second plane parallel to the first (Column 3, Lines 15-25). It would have been obvious to modify the air guns of Sanchez to include the two sets of ports as taught by Sanchez in order to generate different acoustic signals.

Claims 11, 12, 22, 23, 30, 31, 40, 41, 48, 49, 51, 52, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sanchez in view of Nooteboom. Nooteboom teaches equations for calculating the center-to-center spacing of airguns in his "Signature and Amplitude of Linear Airgun Arrays." It would have been obvious to include using a pre-defined equation as taught by Nooteboom in order to calculate the center-to-center spacing of airguns to be within a certain range in order to produce the desired results.

With regard to claim 13, Sanchez discloses a harness 5 including chains 8 and 8' that absorbs a substantial portion of the tension force during towing (Column 1, Lines 5-15).

With regard to claim 14, Sanchez discloses linking members 8 between the sources. He also discloses It would have been obvious to include the linking members taught by Sanchez with collars on the sources of in order to provide a mechanical connection between each source.

With regard to claim 35, Sanchez teaches a collar 8 (Fig. 3) linking all each source to a termination A.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Desler, who discloses underwater seismic energy sources.

Dolengowski, who discloses a frame for underwater acoustic sources.

Laws, who discloses seismic source arrays.

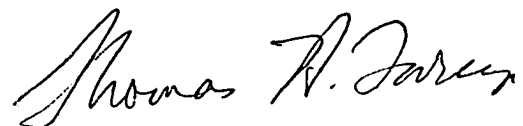
Duren, who discloses marine source subarrays.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott A Hughes whose telephone number is 703-305-0430. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on 703-306-4171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAH

A handwritten signature in black ink, appearing to read "Thomas H. Tarcza".

THOMAS H. TARCZA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3600